WASHINGTON
SCIENCE TRENDS

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HIGHWAY RESEARCH TRENDS

A 38 per cent increase in highway research expenditures is recommended by the Highway Research Board of the National Academy of Sciences which hopes to stimulate greater interest in these problems and financial support from Federal, State, Foundation and Industry sources.

* Here are some of the proposals of technical interest which may serve to point the way to future projects, and suggested financing:

ø Snow and Ice Removal -- Chemicals in general use in quantities required for major routes are costly and may damage some pavements and structures. Among the research needs are more effective means of melting snow and ice through new chemicals or application of heat in various ways. ($1 million)

ø Aggregates and Soils -- Means must be developed to improve poor quality aggregates through various processes. Nuclear energy may transform clays and other now undesirable materials into useful substances. Chemical stabilization of soils and development of better means of removing water or eliminating its ill effects should be studied. Radioisotopes to trace water movement and the use of nuclear devices to measure soil density and moisture offer much promise. ($10 million)

ø Traffic-Revenue Forecasting -- Availability of high-speed computers offers new opportunities for forecasting traffic volumes for individual routes and for estimating revenues. ($250,000)

ø Development of Driving Simulator -- Simulation in the laboratory of actual road conditions would provide great flexibility in research. Television reproduction of desired testing conditions, controlled by computer programs to respond to the driver's reactions, offers great promise. This would permit investigators to measure the effect on driving performance of traffic control devices, surface characteristics, lighting, other traffic, weather conditions and the like. ($3,500,000)

ø Electronic Vehicle Control -- Electronic devices now available could control the direction and speed of vehicles but cost considerations and the need for complete reliability are problems. First step should be establishment of criteria to define such problems as limits of precision required, to determine what information should be transmitted to the driver, etc. ($3 million)

ø Road-Vehicle Dynamics -- Techniques currently employed for aircraft design may be adapted for analysis of the interactions of road and vehicles. Recent studies point up wide differences when the dynamic loads of vehicles in motion are compared to their static load. ($500,000)

(Report available. 117 Pages. $2.80. Write Highway Research Board, 2101 Constitution Avenue, N. W., Washington 25, D. C. for H.R.B. Special Report No. 55.)

* PETROLEUM PRODUCT ANALYSIS

Accurate determination of metals in petroleum products is said to be practical with a new set of 24 standard metal-organic samples developed by the National Bureau of Standards. The samples can be applied in refining research, in studies of engine wear, in the use and control of materials added to oils to improve lubrication, and other areas.

Standards now available contain the following elements: Aluminum, barium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, mercury, nickel, phosphorous, potassium, silicon, silver, sodium, strontium, tin, vanadium and zinc.

(Materials, in crystalline form for easy weighing and handling available at $6 per 5 g. Includes a certificate of analysis and directions for preparing. Direct orders to Standard Sample Clerk, National Bureau of Standards, Washington 25, D. C.)

* NEW LABORATORY APPARATUS

National Science Foundation is continuing its program of grants for the design and development of new laboratory equipment to help modernize the teaching of mathematics, science and engineering in the Nation's schools and colleges. Another 32 grants totaling $284,450 have been awarded.

(Grantees are expected to permit interested commercial suppliers to enter negotiations for production and marketing of equipment developed under this program. For details of the latest grants write Information Office, National Science Foundation, Washington 25, D. C. Ask for NSF-60-125 and attached Grant List)

* DIRECT CONVERSION RESEARCH

Atomic Energy Commission officials were surprised by recent Congressional action threatening a $400,000 cut in funds for direct energy conversion research. Their original estimate was that $2,400,000 was required for this program. Studies include the effect of inpile irradiation exposure on a wide variety of thermoelectric materials with the aim of developing a thermoelectric fuel element and the work at Los Alamos on the plasma thermocouple, a thermionic device. The legislators reasoned that "private enterprise is investing heavily (and) it is believed appropriate to hold the Federal program to a modest level."

* LIQUID PROPELLANT STUDIES

Test firings at Edwards Air Force Base, Calif., indicate to Jet Propulsion Laboratory researchers that a chlorine trifluoride-hydrazine propellant system can be handled and used without incident if reasonable care and precautions are exercised. The combination has advantages of storability, performance and average density which might make it advantageous for shipboard or air-launched missiles; storable, instantly ready defensive missiles or propulsion systems designed to fire after a long period of coasting in a space vehicle. Care is necessary because of toxicity and extreme chemical activity, but experience indicates that these difficulties can be overcome.

* WEDDING RING DOSIMETERS?

Wedding rings are among the unusual types of dosimeters being studied by government researchers at Los Alamos and the Aerospace Medical Center, Brooks Air Force Base, Tex. Objective of the program is a means of determining radiation dosage of personnel exposed through accident or enemy attack.

Air Force found that 87 per cent of its married men already wore wedding rings. Gold rings were irradiated in a known flux of thermal neutrons. Variations in the induced gamma ray activity resulting from differences in ring size and gold content are now being analyzed and calibrated. Doses as low as 25 to 50 rad can be measured.

Also under study:

Hair which contains sulfur which captures fast neutrons and changes to phosphorous which then decays by beta emission; dental fillings, inlays and partial plates; and money, particularly copper and gold.

Miniature gamma ray detectors, consisting of chemical dosimeters surrounded by lithium and encased in aluminum, are being developed at Los Alamos. A unit of ½ inch in height and 5/16th of an inch in diameter has been built to be incorporated in buttons or belt buckles.

* FOAMING AIRPORT RUNWAYS

Navy studies indicate that there is a sound basis for foaming aircraft runways when disabled planes must come down for "belly landings." Prior to its tests, the Navy reports, the foaming techniques were based primarily on supposition.

Chemical fire-fighting foam was used in the experiments, which were carried out with different metals, types of runways, fuels and foaming techniques. Among the conclusions:

- ø Contrary to opinion, the lubricating or "slipperiness" effect of foam is almost negligible.
- ø Foam does dampen or suppress friction sparks of airframe metals contacting the surface -- by 100 per cent in 9 out of ten tests.
- ø Optimum foam depth is 2 inches and the foam should be applied early enough so that the water has time to settle onto the runway - 10 to 15 minutes. This will remain effective for at least 2½ hours.
- ø Foam was least effective against magnesium and titanium sparking; most effective against aluminum which did not spark at all. Cold-rolled steel sparked very little, even on dry pavement, while the spark-inhibiting effect of the foam was about equal for steel alloys and stainless steels.

* TRIASSIC SYSTEM MAPS

A comprehensive survey of thousands of observations of the geologic record left during the 30-million-year long Triassic Period has been published by the U. S. Government. The information is expected to be particularly valuable in exploration for petroleum and many types of mineral deposits.

(Collection of maps, text and charts available at $5 each with quantity discounts from Distribution Section, U. S. Geological Survey, Denver, Colo. or Washington 25, D. C. or "over the counter" at Survey offices elsewhere.)

PUBLICATION CHECKLIST

( ) NUCLEAR TEST DETECTION, a summary and analysis of recent Congressional hearings covering the detection and identification of underground tests, the use of seismic detection, detection and identification of nuclear explosions at high altitudes and in space, and related matters. 78 Pages. Single Copies Free. (Write Joint Committee on Atomic Energy, F-88, The Capitol, Washington 25, D. C. for Technical Aspects of Detection, Summary-Analysis, May 1960)

( ) MICROFILM IN THE NAVY, a special issue of the Navy Management Review covering the use of microfilm for data processing, for aircraft engineering drawings and a variety of other applications. 16 Pages. 15 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. NAVEXOS P-910, Vol. V, No. 4)

( ) AERIAL PHOTO INTERPRETATION, a new training handbook by the Forest Service on basic techniques in Forest Photo Interpretation with laboratory exercises ranging from elementary stereovision through problems of photo sampling, aerial estimating of timber volumes, and preliminary location of roads and trails. 73 Pages. (Write Intermountain Forest & Range Experiment Station, Forest Service, U.S.D.A., Ogden, Utah for Training Handbook, Basic Techniques in Forest Photo Interpretation)

( ) TUNGSTEN, a new bibliography listing references since 1911 on methods of improving the purity of this "missile age" metal, from processing the ore to treating the finished metal. Describes 262 articles, books and patents. 35 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for U. S. Bureau of Mines Info. Circular 7953)

( ) ENGINEERING AND SCIENTIFIC MANPOWER, a description of current engineering and scientific manpower programs in engineering, science and teaching in 15 nongovernmental organizations, 11 Federal agencies and 4 presidential committees. 68 Pages. Single Copies Free. (Write Publications Inquiry Unit, U. S. Office of Education, Washington 25, D. C. for Pub. OE-50003, Circular No. 610)

( ) PENETRATION OF CHARGED PARTICLES IN MATTER, the proceedings of a 1958 conference covering topics ranging from the reliability of experimental data to new approaches in the theoretical description of energy loss mechanisms. Sections include atomic and molecular scattering, ionization in gases and similar topics. 180 Pages. $2. (Write Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue, N. W., Washington 25, D. C. for Pub. No. 752)

( ) ELECTRON TUBE APPLICATIONS, VOL. I, an Air Force compilation of the properties, ratings and applications for pulsed magnetrons, diode rectifiers, grid-controlled rectifiers, transmitting triodes and transmitting tetrodes. Dated Dec. 1958 and now available. 206 Pages. $3.50. (Write OTS, U. S. Department of Commerce, Washington 25, D. C. for PB 151 979)

( ) ELECTRON TUBE APPLICATIONS, VOL. II, coverage as above for twin tetrodes, vacuum rectifiers, grid-controlled rectifiers, transmitting clipper diodes, gas switching tubes, cathode-ray tubes, klystrons and multiplier phototubes. Dated June 1959 and now available. 189 Pages. $3.50. (Write OTS, U. S. Department of Commerce, Washington 25, D. C. for PB 161 088)

Missile Ground Support Equipment Directory

Here is a revised and expanded version of the special directory of missile ground support contacts, based on official information from the Office of the Director of Defense Research and Engineering. This directory, to appear weekly until completed, replaces the original edition supplied to subscribers in February + MAY 1966

How to Use: This directory is a guide to responsible civilian and military officials in the Defense Department and military services available for inquiry and consultation on future ground support planning and requirements, particularly in the field of research and development.

Army - - Ordnance Corps

Subject	Contact
Vehicles and vehicle Components	Ordnance Tank-Automotive Command (OTAC) Research and Engineering Directorate Detroit Arsenal Centerline, Michigan Telephone: JEfferson 6-5000 Lt. Col. J. H. Davis, Director Research and Engineering, OTAC, Ext. 28118 or 25130 Mr. P. R. Van Thielen Chief Development Engineer, Ext. 29126 or 25129 Mr. William K. Wittig, Chief, Guided Missile Support Branch, Ext. 31252
Axles and differentials Bearings--ball and roller Steering devices	Mr. Carl F. Rauen, Ext. 20138
Bodies--truck and trailer, general-and special-purpose	Mr. Lewis Elzey, Ext. 23151
Brakes and brake systems Cooling systems, including radiators, thermostats and hose Hydraulic systems	Mr. Andrew Kalls, Ext. 25207
Electrical systems, automotive	Mr. Robert F. Zuege, Ext. 28245
Engines, automotive	Mr. Addo Giovannini, Ext. 24130
Suspensions	Mr. P. H. Van Cauwenberg, Ext. 26215
Tires, tubes, wheels and rims	Mr. Paul Jackson, Ext. 20119
Trailers, semitrailers, dollies, trucks and tracked vehicles	Mr. William K. Wittig, Ext. 31252
Transmissions	Mr. M. P. Whalley, Jr., Ext. 33141

(Continued)

Subject	Contact
	Ordnance Missile Command Redstone Arsenal Huntsville, Alabama Telephone: JEfferson 6-4411
	Army Ballistic Missile Agency (ABMA), R&D Division
Systems Design and Development Laboratory	Mr. Lewis L. Gober, Director, Ext. 34616
Electronic Section	Mr. James H. Robinson, Ext. 35073
Systems Equipment Design Branch	Mr. Harold H. Stevenson, Ext. 33717
	Army Rocket and Guided Missile Agency (ARGMA), R&D Division
Advanced Techniques and Components Branch	Mr. John A. French, Chief Ext. 34848
Electro Mechanical Section	Mr. L. W. Brennaman, Chief Ext. 32201
Guidance Section	Mr. R. W. Nelson, Ext. 32746
Test Equipment Section	Mr. Charles H. Ray, Ext. 32327
	Development and Proof Services Aberdeen Proving Ground, Maryland Telephone: ABerdeen 1000
Office of the Director	Col. G. P. Dubia, Dir., Ext. 31100
	Mr. B. S. Goodwin, Associate Director Ext. 47284
Automotive Division	Mr. W. A. Gross, Jr., Chief Ext. 43289
	Mr. C. D. Montgomery, Chief Engineer Ext. 43229
Automotive Laboratory	Mr. R. W. Johnson, Chief, Ext. 41103
Combat Vehicle Branch	Mr. B. D. Sissom, Chief, Ext. 47193
Engineering Testing	Mr. H. A. Noble, Assistant Director for Engineering Testing, Ext. 44134
Transport Vehicle Branch	Mr. C. F. Waters, Chief, Ext. 41296
	Office of Ordnance Research Box CM, Duke Station, Durham, N. C. Telephone: DUrham 82285
Environmental Research	Mr. Park W. Espenschade
	The Surgeon General
Medical and dental equipment and supplies	U. S. Army Medical Research and Development Command Main Navy Building, Washington 25, D.C. Telephone: OXford 67427 Major Frederick M. Wells